

A RE-EVALUATION OF *PHYSARIA DIDYMOCARPA*
VAR. *INTEGRIFOLIA* (CRUCIFERAE)

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ABSTRACT

Specific status is given to *Physaria didymocarpa* var. *integrifolia* and a new variety, *P. integrifolia* var. *monticola*, is described. This new variety is known from the mountains of western Wyoming and eastern Idaho.

Rollins (1939) considered *Physaria didymocarpa* (Hook.) Gray to be remarkably uniform in the northern part of its range. He also commented that *P. didymocarpa* var. *integrifolia* Rollins from west-central Wyoming showed certain transitional stages to its southern analogue, *P. acutifolia* Rydb. (as *P. australis* (Payson) Rollins). Then Rollins (1983), while discussing several evolutionary trends in *Physaria*, pointed out that the thin, inflated silique valves are better adapted for wind dispersal than the heavier-walled, less inflated ones. In doing so, he made note that this trend can be seen between and even within species. His example for within a species was, "Over most of the geographic range of the species, populations of *P. didymocarpa* (Hook.) Gray have siliques with heavy-walled valves, but var. *integrifolia* Rollins, which is restricted to western Wyoming and eastern Idaho, has thin, highly inflated valves." In addition to observations by Rollins, recent field, herbarium, and laboratory studies by the author can now justify specific separation of *P. didymocarpa* var. *integrifolia* from the more northern var. *didymocarpa*. *Physaria didymocarpa* var. *didymocarpa* and var. *lanata* A. Nels. have dentate leaves and spreading trichome branches on the siliques, whereas var. *integrifolia* has entire leaves and appressed trichome branches on the siliques. Scanning electron micrographs show highly branched trichomes with a distinct central umbo in var. *integrifolia* as compared to less branched trichomes lacking a distinct umbo in var. *didymocarpa* and *lanata* (Rollins and Banerjee 1975). I therefore elevate *P. didymocarpa* var. *integrifolia* to specific status.

***Physaria integrifolia* (Rollins) Lichvar, stat. nov.**—Based on *Physaria didymocarpa* (Hook.) Gray var. *integrifolia* Rollins, Rhodora 41:407. 1939. TYPE: WY, Lincoln Co.: Grand Canyon of the Snake River, 8 Jul 1932, *L. Williams 809* (GH).

Rollins (1981) discussed the infrequent occurrence of a retoños root system in only two species of *Physaria*, *P. brassicoides* Rydb. and *P. alpina* Rollins. This type of branching root system gives rise to rosettes that emerge several centimeters from the main plant. In western Wyoming and eastern Idaho, there is an undescribed taxon that commonly displays this unusual character. It is closely related to *P. integrifolia* in leaf shape, but it has other distinguishing characters.

Physaria integrifolia (Rollins) Lichvar var. **monticola** Lichvar, var. nov. (Fig. 1).

Radix primaria divisa; folia radicalia 1.5–3.5 × 0.5–1.5 cm; inflorescentia fructifera foliis (2–)4–6(–9) cm longior.

Perennial with an underground branching root system or rarely a simple tap root, caespitose, silvery-stellate throughout; caudex mostly branched, sometimes simple; radical leaves entire, oblanceolate to obovate, rounded to acute at apex, the blade 1.5–3.5 cm long, 0.5–1.5 cm wide, abruptly tapered to a slender petiole, (1–)2.5–4.5 cm long; inflorescence compact to elongate in fruit and exceeding leaves by (2–)4–6(–9) cm; sepals erect, pubescent, 5–6 mm long, ca. 2 mm wide; petals yellow, spatulate, 8–10 mm long, 3–4 mm wide; siliques didymous, inflated at maturity, with deep apical and basal sinuses, 1–2.5 cm wide, 1.1–2.1 cm long; valves suborbicular with an elliptical orifice; styles 5–8 mm long; replum linear to oblong, not constricted, 3–5 mm long, ca. 2 mm wide; ovules 4(3–6) in each loculus; seeds elliptic, 3–4 mm long, 2–3 mm wide.

TYPE: USA, WY, Lincoln Co.: Wyoming Range e. of Soda Lake (T32N R115W S12 NE¼), 2469 m elev., 8 Jul 1981. Rocky calcareous slope, associated with *Artemisia tridentata*, *Penstemon humilis*, and *Ipomopsis aggregata*. Robert W. Lichvar 4586 (Holotype: RM; isotypes: to be distributed).

PARATYPES: USA, WY, Lincoln Co.: Wyoming Range, Shale Cr. drainage (T30N R116W S17 SE¼), 27 Jun 1979, *L. M. and J. S. Shultz* 3443 (GH); Wyoming Range, Middle Piney Lake (T30N R115W S8 NE¼), 8 Jul 1982, *Lichvar* 5222 (RM); McDougal Gap (T33N R115W S8), 18 Aug 1982, *Dorn* 3822 (RM); Salt River Range, Mt. Wagner (T30N R118W), 4 Aug 1979, *L. M. and J. S. Shultz* 3650 (GH); Wyoming Range, Triple Pks. (T32N R115W S7), 18 Aug 1978, *J. S. Shultz* 347 (RM); Wyoming Range, Wyoming Pk. (T30N R116W), 24 Aug 1978, *L. M. Shultz* 2972 (GH); Salt River Range, Lake Barstow (T32N R117W S7 SE¼), 5 Aug 1979, *L. M. Shultz* 3722 (GH); Salt River Range, hills e. of Afton, 28 Jun 1923, *Payson and Armstrong* 3825 (RM); Sublette Co.: Wyoming Range, Cottonwood Cr. (T32N R115W S12), 26 Jun 1978, *L. M. and J. S. Shultz* 2653 (RM); same location, 8 Jul 1982, *Lichvar*

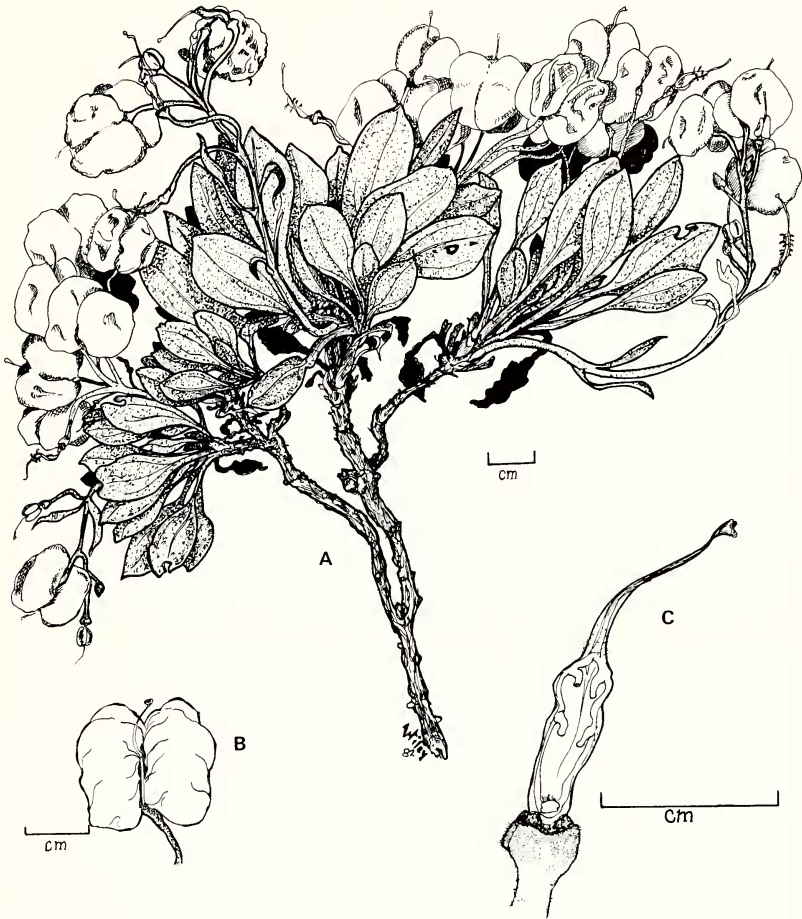


FIG. 1. *Physaria integrifolia* var. *monticola* (from the type). A. Habit. B. Silique. C. Replum.

5223 (RM); Teton Co.: Sheep Mtn. ca. 14 mi ne. of Jackson, 30 Jul 1957, *Beaman and Stone 1490* (GH); IDAHO, Bonneville Co.: Caribou Range, 9 air mi s. of Palisades Dam (T2S R45E S31), 22 Jul 1971, *Holmgren and Marttala 5584* (GH).

In the key to the Wyoming species of *Physaria* (Lichvar 1983), *P. integrifolia* var. *monticola* would key to *P. didymocarpa* var. *integrifolia*, from which it differs as follows:

1. Inflorescence exceeding leaves in fruit by (6-)8-14 cm, leaf blades 4-6 cm long, petioles 4-8 cm long, root system mostly simple
 *P. integrifolia* var. *integrifolia*



FIGS. 2-3. Leaf trichomes of *Physaria integrifolia*. 2. (Top) Var. *monticola* (from the type), $\times 190$. 3. (Bottom) Var. *integrifolia* (from Lichvar 4329), $\times 150$.

1. Inflorescence exceeding leaves in fruit by (2-)4-6(-9) cm, leaf blades 1.5-3.5 cm long, petioles (1-)2.5-4.5 cm long, root system usually highly branched *P. integrifolia* var. *monticola*

The leaf trichomes of var. *monticola* have a depressed central umbo that blends into the bases of the shanks (Fig. 2) rather than a conical umbo that is distinct from the shanks as in var. *integrifolia* (Fig. 3) (Rollins and Banerjee 1975).

Specimens of var. *monticola* commonly have a highly branched root system, but those with a simple tap root can easily be distinguished from var. *integrifolia* on leaf length and plant height (4-15 cm vs. 12-20 cm, respectively). Variety *monticola* can be distinguished easily from other entire leaved physarias as follows: smaller specimens of var. *monticola* can be separated from *P. condensata* Rollins by linear to oblong replums and rounded to acute leaf tips rather than obovate replums and acute leaf tips. Variety *monticola* differs from *P. dornii* Lichvar in that the inflorescence exceeds the leaves by (2-)4-6(-9) cm rather than 2-3 cm, the plants are loosely caespitose rather than in a condensed rosette growth form, and the replums are linear to oblong rather than obovate. Variety *monticola* differs from *P. eburniflora* Rollins in that the fruit trichomes are appressed, the leaves oblanceolate to obovate, the replum linear to oblong, and the petals yellow compared to erect fruit trichomes, nearly orbicular leaves, elliptic to obovate replum, and whitish petals in *P. eburniflora*.

ACKNOWLEDGMENTS

I thank Reed Rollins for his extremely useful discussion of the genus; Robert Dorn, Ronald Hartman, and William Weber for reviewing and editing the manuscript; Robert Bowman for his help with the SEM photographs; Robert Wiley for his excellent illustration; and Rupert Barneby for his Latin diagnosis. I also thank the curators of the following herbaria for the loan of specimens: COLO, DAO, GH, ID, MONT, MONTU, NDA, NEB, NY, RM, SDU, US, and UTC.

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(Received 23 Mar 1983; accepted 22 Mar 1984.)